

Patent claims

1. An apparatus for the disinfection of an air conditioning installation of a stationary air conditioning system of a building or a room, with
 - an injection device (3, 11, 14) for the accurate ejection of a defined quantity of an antibacterial active substance onto an evaporator (1) of the air conditioning installation, and
 - 10 - a control device (18, 19) for controlling the ejection times of the injection device in the automated repetition mode.
2. The apparatus as claimed in claim 1, characterized in that
 - the air conditioning system is an installation with a plurality of ventilation ducts for the air conditioning of a room at a plurality of points and/or of a building having a plurality of ventilated rooms, and
 - 20 - the evaporator (1) is an integral part of a central air conditioning installation of the air conditioning system for all the ventilation ducts which the air conditioning system comprises.
3. The apparatus as claimed in claim 1 or 2, characterized in that
 - the injection device comprises a reservoir (3) for storing the antibacterial active substance, an injection pump (11) activated electrically by the control device, and at least one nozzle head (14) connected to an outlet of the injection pump via a pipeline (13).
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4. The apparatus as claimed in claim 2 or 3, characterized in that
 - the injection pump (11) has a compressible volume
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filled with active substance and an actuating mechanism, in particular a magnetic pulse generator, for the abrupt compression of the volume.

5. The apparatus as claimed in one of claims 2 to 4, characterized in that

- a nonreturn valve (12) is arranged between the outlet of the injection pump (11) and the nozzle head (14).

6. The apparatus as claimed in claim 5, characterized in that

- the nonreturn valve (12) is provided with a prestressing means which has the effect that an opening of the valve in the throughflow direction takes place only when the prestress is exceeded.

7. The apparatus as claimed in one of claims 3 to 6, characterized in that

- the injection device (3, 11, 14) is designed in such a way that an air-free ejection of the active substance fluid at the nozzle head takes place.

8. The apparatus as claimed in one of claims 3 to 7, characterized in that

- the nozzle head (14) is mounted on the pipeline in an articulated manner.

9. The apparatus as claimed in one of claims 3 to 8, characterized in that

- the nozzle head (14) has a spray cone with an opening angle of between 135° and 170° , in particular between 145° and 160° .

10. The apparatus as claimed in one of the preceding claims, characterized in that

- the control device (18, 19) for controlling the ejection times of the injection device (3, 11, 14) allows a variable setting of the ejection times.

11. The apparatus as claimed in one of the preceding claims, characterized in that

- the control device (18, 19) is designed to control the active substance quantity to be ejected.

12. The apparatus as claimed in one of the preceding
5 claims, characterized in that

- the air conditioning system comprises a control unit for controlling the air conditioning installation, and
- the control device (18, 19) of the injection
10 device (3, 11, 14) is connected to the control unit of the air conditioning installation.

13. The apparatus as claimed in one of the preceding
claims, characterized in that

- 15 - the control device comprises an electric motor (18), a rotatable control disk (20) driven by the electric motor, and at least one electrical switch (26) which can be actuated by means of one or more actuating members (24, 25) mounted on the control
20 disk (20) and which is provided for switching a current for the injection pump (11) of the injection device (3, 11, 14).

14. The apparatus as claimed in one of claims 1 to 12,
25 characterized in that

- the control device (18, 19) comprise an electrical circuit which activates the injection pump (11) of the injection device at predeterminable times.

30 15. The apparatus as claimed in one of the preceding claims, characterized in that

- an active substance concentrate is used as active
substance fluid.

35 16. The apparatus as claimed in one claims 3 to 15, characterized in that

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- the apparatus has a plurality of nozzle heads (14) which are fed by the injection pump (11) via respective pipelines.

17. The apparatus as claimed in one of the preceding claims, characterized in that, furthermore, the apparatus has:

- 5 - a metering device (3, 11', 14') for the time-controllable dispensing of an aromatic substance, and
- 10 - an absorbent uptake carrier (15) which is provided in a duct (2) of the air conditioning system and onto which the aromatic substance dispensed by the metering device is metered.

18. The apparatus as claimed in claim 17, characterized in that

- 15 - the metering device (3, 11', 14') is designed in the form of a further electromechanical injection device for ejecting the aromatic substance onto the absorbent uptake carrier (18).

19. The apparatus as claimed in claim 17 or 18, characterized in that

- 20 - the control device (18, 19) is provided both for controlling the injection device (3, 11, 14) for injecting the antibacterial active substance and for the time control of the metering device (3, 25 11,', 14') for metering the aromatic substance onto the absorbent uptake carrier (15).

20. The apparatus as claimed in claim 19, characterized in that

- 30 - the control device (18, 19) is designed to make it possible to dispense antibacterial active substance and aromatic substance independently in terms of quantity.

35 21. The apparatus as claimed in claims 13 and 17 to 20, characterized in that

- the control device (18, 19) comprises a further switch (26') which is provided for switching a current for the metering device (3, 11', 14'), and
- the rotatable control disk (20) comprises, in addition to the actuating members (25) for actuating the switch (26) for switching the current for the injection pump of the injection device for the antibacterial active substance, further actuating members (24) which are provided for actuating the further switch (26').

22. The apparatus as claimed in one of claims 17 to 21, characterized in that

- the absorbent uptake carrier (15) consists of a fiber-containing and/or open-pore material, in particular cellulose or an absorbent paper.

23. The apparatus as claimed in one of the preceding claims, characterized in that

- the control device (18, 19) of the apparatus comprises a remote monitoring and/or remote operating device, by means of which the apparatus can be monitored and/or operated by the user.

24. The apparatus as claimed in one of the preceding claims, characterized in that

- the apparatus comprises, furthermore, a UV lamp (30) for irradiating the air stream in the air conditioning system.

25. The apparatus as claimed in one of the preceding claims, characterized in that

- the UV lamp (30) is provided with air guide elements (34) which are designed in such a way

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that an air stream flowing past the UV lamp (30)
has at least partially a prolonged dwell time in
the region of the UV lamp (30).

5 26. The apparatus as claimed in claim 25,
characterized in that

- the air guide elements (34) are ducts which run along a curved surface of the UV lamp (30).

27. The apparatus as claimed in claim 26,
5 characterized in that

- the UV lamp (30) has a cylindrical shape, and
- the ducts (34) extend at least part-circularly over the circumference of the UV lamp (30).

10 28. A UV lamp, characterized by

- one or more of the characterizing features of claims 25 to 27.

29. A method for the disinfection of an air
15 conditioning installation of a stationary air conditioning system of a building or room, having the steps,

- determination of ejection times by means of a control device; and
- 20 - at the ejection times, accurate pulsed injection of an antibacterial active substance onto an evaporator of the air conditioning installation by means of an electromechanical injection device.

25 30. The method as claimed in claim 29, characterized by the step

- control of the ejection times as a function of the operating state of the air conditioning installation.

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31. The method as claimed in claim 29 or 30, characterized in that

- the active substance is applied to the evaporator (1) during the continuous operation of the air
35 conditioning installation.

32. The method as claimed in claim 29 to 31, characterized by the further step:

- time-controlled metering of an aromatic substance onto an absorbent uptake carrier (15), located in a duct (2) of the air conditioning system, by means of a metering device (3, 11', 14').

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33. The method as claimed in claim 32, characterized in that

- the time control of the injection device (3, 11, 14) for the injection of the antibacterial active substance and the time control of the metering device (3, 11', 14') are carried out by means of one and the same control device (18, 19).

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34. The method as claimed in one of claims 29 to 33, characterized by the step,

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- irradiation of the air stream lead through the air conditioning system by means of a UV lamp (30).